

3C3[®]
PERFORMANCE
EXCELLENCE

POE SOLUTIONS



Think Solutions Think 3c3

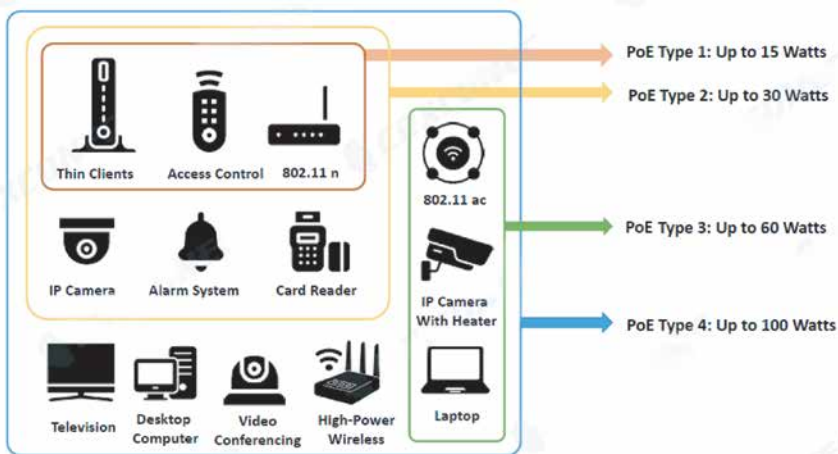
www.3C3.in

PoE Solutions

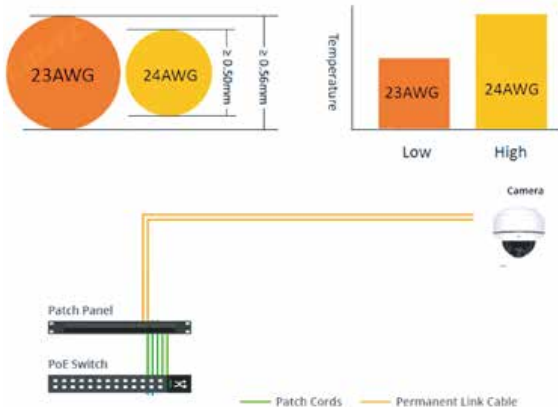
Power over Ethernet (PoE) stands for a proven method of delivering DC power over the same twisted pair cabling used for LAN data transmission. Check What Is Power over Ethernet (PoE)? for further learning. The IEEE (Institute of Electrical and Electronics Engineers) standards for Power over Ethernet are 802.3af, 802.3at, and 802.3bt.

PoE (Power over Ethernet) Standard

	Type 1	Type 2	Type 3	Type 4
Standard	IEEE 802.3 af	IEEE 802.3 at	IEEE 802.3bt	IEEE 802.3bt
Watts of Power	15W	30W	60W	100W
Twisted Pair Used	2-Pair	2-Pair	4-Pair	4-Pair
Max.Distance	100M	100M	100M	100M



Which cable is more reliable 23 AWG or 24 AWG?



When we look at Power Over Ethernet (PoE) transmission, one of the key considerations is the selection of the media of Ethernet wires, specifically the choice between 23 AWG and 24 AWG.

The larger the diameter of the conductor used in the Ethernet cable, the easier and faster the electrons that provide the signal transmission move.

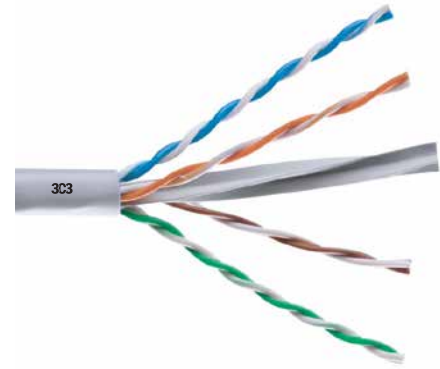
In addition, IEEE 802.3.af and IEEE 802.3.at standards require 15 and 30 W per port (device), while Type-4 requires 100 W. The more power consumption, the more heat is dissipated. A Type-4 class PoE application generates 20 times more heat than a Type-1 application! The cause of this heat is the voltage loss across the cable and may lead to system malfunctioning unless properly handled.

Thus selecting 23 AWG cables is better for PoE Applications.

Copper PoE + Solutions

Category 6 Unshielded Bare Copper Cables

Category6 Unshielded Twisted Pair (UTP) Cable consists of HDPE Insulated 8 x 23AWG Solid Bare Electrolytic Grade Copper Conductors Twisted as 4 Pairs. These Structured Cables are Suitable for Gigabit Ethernet {1000Base-T} Requirement for Applications such as High Speed Data, Voice & Video Signals over LANs, Server Farms and Other Bandwidth Sensitive Indoor Applications.



CONSTRUCTION		VALUE
Construction	AWG	23/24
	Material	Solid Bare Copper
Insulation	Material	High Density Polyethylene
Jacket	External OD	5.9 ± 0.3
	Material	LSZH/FRPVC/PVC

Features

- Bare Solid Copper Conductor
- Color: Coded PE Insulation
- Operating Temperature : -10°C to +60° C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801 2.2 Edition
- CENELEC EN 50173-1 : 2011
- RoHS Directive 2011/65/EU Compliant

Copper PoE + Solutions

Category 6 Unshielded Patch Cables

Category 6 UTP Patch cords are manufactured using high quality un-shielded 4 Pair Stranded cable and features cable strain relief boot with plug latch protection cap. These high performance components available in broad range of lengths. They are designed to meet or exceed Cat6 specifications. Conductors are securely mated with unshielded RJ45 plug design to deliver superior performance.



CONSTRUCTION		VALUE
Construction	AWG	24
	Cable Diameter	5.86 ± 0.3mm
	Material	Solid Bare Copper
Insulation	Material	PE
Jacket	External DD	0.6 ± 0.02

Features

- Quality 24 AWG Stranded Flexible Cable
- High Grade 50µ Gold Plated RJ45 Connectors
- Injection Molded boot/Strain Relief Boot for improved performance
- Soft Latch - cover design for easy depression
- Operating Temperature : -10° C to +60° C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801 2.2 Edition
- CENELEC EN 50173-1 : 2011
- RoHS Directive 2011/65/EU Compliant

Copper PoE + Solutions

Category 6 Unshielded Keystone Jack

Category 6 RJ45 Keystone Jacks conform to ISO class E performance. Due to their small form design, they are perfect for high-density applications. The connection is established without using solder. Press-Fit technology connections avoid quality problems such as cold spots, voids, splatters, and cracks and is highly reliable than soldering. Press-Fit technology does not use solder, it uses no lead {Pb} and there is no extra heat on the connections, it makes the connections clean, reliable, and meets RoHS standards.



CONSTRUCTION	VALUE
Housing	Plastic Housing, ABS UL94V-0 Rated
Jack Wire	0.35 Phosphor bronze gold over nickel plating
IDC Conductor	0.5mm Phosphor Bronze, Tin-Plating
Durability	200 Termination Cycles
Plug Insertion Life	≥ 750 Cycles with FCC Compliant RJ45-Plug
Plug & Jack Contact Force	≥ 100 Grams with FCC Compliant RJ45-Plug
Plug Retention Force	≥ 11 lbf

Features

- Innovative press fit technology with fully RoHS Compliant (No Solder-No Leads)
- Fast Termination with One punch Keystone Tool.
- Integrate with T568A and T568B wiring diagram.
- Meets and exceeds EIA/TIA Performance requirements.
- Operating Temperature: -10°C to + 60°C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801 2.2 Edition
- CENELEC EN 50173-1 : 2011
- ISO/IEC 60603-7-41 Compliant
- RoHS Directive 2011/65/EU Compliant

Copper PoE ++ Solutions

Category 6A Shielded Bare Copper Cables

Category 6A High Speed 10 Gigabit Ethernet Shielded Cable is produced using 8 x 23 AWG Solid Bare Copper Conductors. Every pair or the entire 04 pair are shielded - pairs in metal foil (PIMF). These Structured Cables are Suitable for 10/100/1000 Base-T, 155Mbps ATM, IEEE 802.3an (10GBase-T) Standard.



CONSTRUCTION		VALUE
Insulation	AWG	23
	Material	Stranded Bare Copper
Insulation	Material	Foam Polyethylene
Jacket	External DD	7.5±0.04
	Material	LSZH

Features

- Bare solid copper Conductor
- Color : Coded Foam PE Insulation
- Operating Temperature: -10°C to +60°C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801
- EN 50173
- RoHS Directive 2011/65/EU Compliant

Copper PoE ++ Solutions

Category 6A Shielded Patch Cables

Category 6A S/FTP Patch cords are manufactured using high quality 4 Pair Solid cable and features cable strain relief boot with plug latch protection cap. These high performance components available in broad range of lengths. They are designed to meet or exceed Cat6 specifications. Conductors are securely mated with Shielded RJ45 plug design to deliver superior performance



CONSTRUCTION		VALUE
Conductor	AWG	26
	Conductor diameter	0.57+0.01
	Material	Solid Bare Copper
Cable	Type	S/FTP
Shielding	#1	Al-Mylar Tape with Drain Wire
	#2	Alloy Braiding
Jacket	External OD	LSZH

Features

- Quality 26 AWG Solid Cable
- High Grade 50 Gold Plated Fully Shielded RJ45 Connectors
- Transparent Strain Relief Boot with Soft Latch-cover design
- Operating Temperature : -20°C to +60°C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801
- EN 50173
- RoHS Directive 2011/65/EU Compliant

Copper PoE ++ Solutions

Category 6A Shielded Keystone Jack

Category 6A Shielded keystone Jacks are Press-fit Technology design which completes the insertion of the IDC and RJ45 contacts into the PTH (Plated-Through Hole) on a PCB (Printed Circuit Board). The connection is established without using solder. Press-Fit technology connection avoid quality problems such as cold spots, voids, splatters, and cracks and is highly reliable than soldering. Press-Fit technology does not use solder, it uses no lead (Pb) and there is no extra heat on the connections, it makes the connections clean, reliable, and meets RoHS



CONSTRUCTION	VALUE
Housing	Zinc Die-Casting with quality Nickel Plating
Jack Wire	0.35 Phosphor bronze gold over nickel plating
IDC Conductor	0.5mm Phosphor Bronze, Tin-Plating
Durability	200 Termination Cycles
Plug Insertion Life	≥ 750 Cycles with FCC Compliant RJ45-Plug
Plug & Jack Contact Force	≥ 100 Grams with FCC Compliant RJ45-Plug
Plug Retention Force	≥ 11 lbf

Features

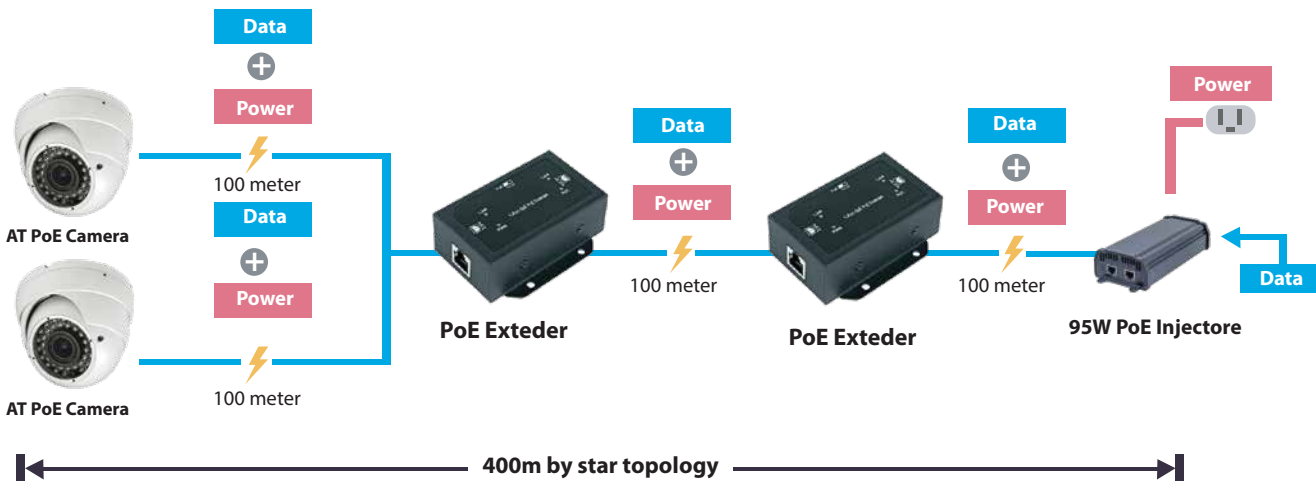
- Innovative press fit technology with fully RoHS Compliant (No Solder - No Leads)
- No punch down tool required.
- 180 degree design
- Die-cast housing provide EMI, RFI and excellent AXT suppression.
- Provides excellent work in suppressing internal magnetic coupling up to 500MHz.
- Operating Temperature : -10°C to +60°C

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801
- PoE ++ type4
- RoHS Directive 2011/65/EU Compliant

Copper PoE + Solutions

PoE Components



PoE Coupler Shielded

PoE Coupler Shielded allows two patch cables to be coupled directly. This Standard keystone jack fits in any keystone wall plate, Patch Panel or surface mount box.



MECHANICAL	VALUE
Coupler Housing	Polycarbonate 94V-0 Plastic
Shell	Brass with Nickel Plated
Contact Holder	High-Impact 94V-0 Plastic
Spring Wire	Phosphor Bronze with Gold Plated on Contact Area
Locking Latch	SUS 304

Features

- 4 Connector Channel with at least 4dB Head Room
- Tool-less Design
- Innovative Press fit technology with fully RoHS Compliant (No solder - No Leads)
- Cat 6A feed through solution for 10G data Center Solutions.
- User Friendly and excellent transmission Performance.

Conformance

- ANSI/TIA/EIA 568.2-D
- ISO/IEC 11801
- ISO/IEC 60603-7-41 Compliant
- RoHS directive 2011/65/EU Compliant

POE Extender (Indoor 30/60/90/95W)

The POE Extender is an ideal for indoor environments where two units can be daisy chain to prolong range of PoE devices such as PoE cameras, wireless APs reaching up to 300m from end to end and 500m by star topology. No power adapter required, PoE Extender is powered by PoE Injector, Middle-Span Hub, or PoE switch over one networking cable extending Ethernet range depending on PD's power consumptions and PSE's power budget per port.



SPECIFICATION	VALUE
PD Input Power	50~57VDC, max. 70W
PSE Output Power	48~55VDC, max. 68W
PD Power Pin Assignment	1-8 Pin
PSE Power Pin Assignment	12(-),36(+),45(+),78(-)
PSE Power On/Off Dip Switch	Support
Surge Protection/PoE Port	12KV
Operating Temperature	-40°C ~ 65°C

Features

- Small form factor with RJ45 connectors
- Saves costs of re-wiring and add-on Ethernet switches
- Plug-and-Play installation
- Drives the reach beyond restricted 100m Ethernet distance
- Supported PSEs providing 95W/90W/60W/30W
- Daisy-chain 2 units of reaching 300m by from end to end
- Complete unit does not require power adapter
- Extends range up to 200m for speed dome

PoE Injector (Indoor 60/90W)

3C3[®] provides a full range of UPoE injectors to power variety of PDs and pass data over network cables remotely. Indoor/ outdoor UPoE 60W middle -span PoE injector are available for specific PDs requiring high power consumption, such as IP speed dome cameras, PoE cameras or PoE camera housing equipped with blower, heater, illuminator and wiper.



SPECIFICATION	VALUE
Input Voltage	100VAC ~ 240VAC, 280VAC 4hr, 300VAC 1min
Output Power	
Power Pin Assignment	1/2 (+), 3/6 (-); 4/5 (+), 7/8 (-)
Surge Protection Data / PoE Port	12KV
Surge Protection for AC Power	4KV
Dimensions (WxHxD)	182 x 78.6 x 41.9 mm
LED Indicators	Power, PoE
Weight	0.58 kg (1.28 lb)
Operating Temperature	-10°C~50°C

Features

- Provide 60W of PoE Power Feeding on 4-pairs
- 12KV PoE surge protection
- AC power surge protection
- Remote power feeding up to 100m
- IEEE 802.3 at compliant
- Automatic detection and protection of non-standard Ethernet terminals
- Supports 10/100/1000Base-T LAN environment
- Safe and reliable power to PoE cameras or WLAN access points

POE Surge Protector Indoor

Power over Ethernet surge protector is designed for POE power supply equipment, are widely used in the areas of wireless coverage, security monitoring etc. to protect the communication equipment's POE port line from the impact of lightning Electromagnetic pulse, lightning electro-magnetic pulse, switching overvoltage.

SPECIFICATION	VALUE
Dimension (LXWXH)	76 X50X25MM
Weight	83g
Temperature	-40 to 85°C,
Relative Humidity	≤95%
Nominal discharge current (8/20μs) In	3KA
I _{max} (8/21μs) I _{max} Limiting Voltage Up	5KA
Line-line (@6kV, 10/700μs)	≤150V
Line-line (@3kA, 8/20μs)	≤150V
Adapt transmission rate V _s	1000Mbps
Insertion loss A _e	≤0.5dB



Features

- Multi. Protection circuits, Gas-Tube+TVS technology
- Dual protection in Common module and different module
- TVS array technology, low capacitance
- Multi-Strike Capability

Application

- Designed for Ethernet device not to be spoiled by lightning over-voltage, induced over-voltage and static discharge.
- CAT6 and CAT5e compatible
- 802.3af
- 10/100/1000 Base-T Gigabit Ethernet protection
- LAN, FDDI, CDDI, ATM, WLAN
- PDH, SDH, SPDH
- Industrial control
- Din rail Mounting

POE Surge Protector Rack Mountable

Power over Ethernet surge protector is designed for POE power supply equipment, are widely used in the areas of wireless coverage, security monitoring etc. to protect the communication equipment's POE port line from the impact of lightning Electromagnetic pulse, lightning electromagnetic pulse, switching overvoltage.



SPECIFICATION	VALUE
Dimension (LXWXH)	186 x106x44mm
Weight	680g
Temperature	-40 to 85°C,
Relative Humidity	≤95%
Nominal discharge current (8/20μs) In	3KA
I _{max} (8/21μs) I _{max} Limiting Voltage Up	5KA
Line-line (@6kV, 10/700μs)	≤150V
Line-line (@3kA, 8/20μs)	≤150V
Adapt transmission rate V _s	1000Mbps
Insertion loss Ae	≤0.5dB

Features

- Multi. Protection circuits, Gas-Tube+TVS technology
- Dual protection in Common module and different module
- TVS array technology, low capacitance
- Multi-Strike Capability

Application

- Designed for Ethernet device not to be spoiled by lightning over-voltage, induced over-voltage and static discharge.
- Cat6A ,CAT6 and CAT5e compatible
- 802.3af
- 10/100/1000 Base-T Gigabit Ethernet Protection
- LAN, FDDI, CDDI, ATM, WLAN
- PDH, SDH, SPDH
- Industrial control

POE Surge Protector Outdoor

Power over Ethernet surge protector is designed for POE power supply equipment, are widely used in the areas of wireless coverage, security monitoring etc. to protect the communication equipment's POE port line from the impact of lightning Electromagnetic pulse, lightning electromagnetic pulse, switching overvoltage.



SPECIFICATION	VALUE
Dimension (LXWXH)	159 x172x78mm
Weight	600g
Temperature	-40 to 85°C,
Relative Humidity	≤95%
Nominal discharge current (8/20μs) In	3KA
I _{max} (8/21μs) I _{max} Limiting Voltage Up	5KA
Line-line (@6kV, 10/700μs)	≤150V
Line-line (@3kA, 8/20μs)	≤150V
Adapt transmission rate V _s	1000Mbps
Insertion loss A _e	≤0.5dB

Features

- Multi. Protection circuits, Gas-Tube+TVS technology
- Dual protection in Common module and different module
- TVS array technology, low capacitance
- Multi-Strike Capability

Application

- Designed for Ethernet device not to be spoiled by lightning over-voltage, induced over-voltage and static discharge.
- CAT6 and CAT5e compatible
- 802.3af
- 10/100/1000 Base-T Gigabit Ethernet protection
- LAN, FDDI,CDDI, ATM, WLAN
- PDH, SDH, SPDH
- Industrial control
- Din rail Mounting

Field Termination Solutions for PoE

Category 6 Field Terminate Plug

Category 6 Field Terminate Plugs are quick, durable high-performance plug terminations in the field for customer-specified length direct connections to any IP based and PoE enabled device in today's data Networks.



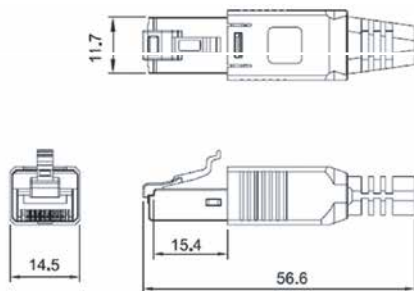
PARAMETER	VALUE
Housing Material	Polycarbonate(PC), UL 94V-0
Contact area	Gold over nickel plating
Insulation resistance	500Mmu, at 500V DC
Current Rating	1.5 Amps maximum
Insulation resistance	500 Mmu minimum, at 500V DC.

Features

- Qualified Screened Class 6 Component
- Permanent Link & Channel ANSI/TIA 568.2-D
- No need of RJ45 jack and patch cord

Conformance

- Compatible with EN 50173 / ISO IEC 11801
- IEC 60603-7-51
- ISO/IEC 11801 2.2 Edition
- CENELEC EN 50173-1:2011



Field Termination Solutions for PoE+

Category 6A Field Terminate Plug

Category 6A Field Terminate Plugs are quick, durable high-performance plug terminations in the field for customer specified length direct connections to any IP based and PoE enabled device in today's data Networks.



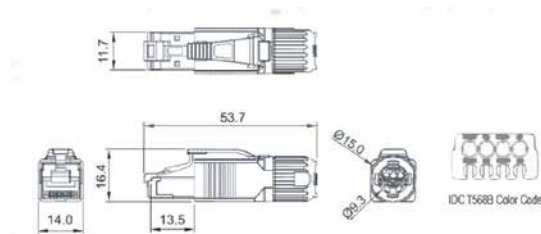
PARAMETER	VALUE
Housing Material	Zinc-alloy fully shielded
Plug-Contact	T=0.35mm phosphor bronze, Contact area: gold over nickel plating
IDC-Contact	T=0.4mm phosphor bronze, Sn over nickel plating
Current Rating	1.5 Amps maximum.
Insulation resistance	500M n minimum, at 500V DC.

Features

- IP20 rated Field Terminable Plug
- Qualified Screened Class 6A Component
- Permanent Link & Channel ANSI/TIA 568.2-D

Conformance

- IEC 60603-7-51
- ISO/IEC 11801 2.2 Edition
- CENELEC EN 50173-1:2011
- Compatible with EN 50173 / ISO IEC 11801



Copper PoE + Solutions

Test Report

Subject: Performance testing of category 6 unshielded channel per IEEE 802.3bt™ for support of Type 4 remote powering applications commonly referred as PoE++

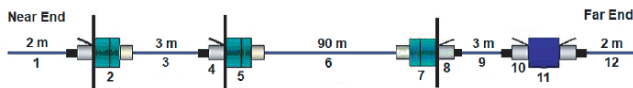
Dear Mr. Kumar:

This letter report represents the results of our evaluation of the above referenced product(s) to the requirements contained in the following document(s):

IEEE Std 802.3bt™ Standard for Ethernet, Amendment 2: Physical Layer and Management Parameters for Power Over Ethernet over 4 Pairs

SECTION 1 SUMMARY

Intertek wishes to inform you that the electrical transmission tests have been performed on your channel configuration. This testing was performed under project G105196890 and quotation CE-QUO-BAN-22-001569 issued 12-July-2022. Compliant results were obtained for the relevant tests contained in section 145 of IEEE 802.3bt™ for channel transmission performance.



Component Id	Manufacturer	Description	Part number
1	3C3	U/UTP LSZH Patch Cord	20200-0200
2	3C3	Patch Panel / Unshielded Outlet	11800 / 12200
3	3C3	U/UTP Outdoor Armoured Cable	10201-0026
4	3C3	Shielded Field Terminable Plug	12819
5	3C3	Patch Panel / Unshielded Outlet	16801 / 12202
6	3C3	U/UTP LSZH Horizontal Cable	10200
7	3C3	Patch Panel / Unshielded Outlet	16800 / 12206
8, 10	3C3	Unshielded Field Terminable Plug	12806
9	3C3	U/UTP Outdoor Solid Cable	86206-0302
11	3C3	Faceplate / Coupler	14044, 14440 / 13206
12	3C3	U/UTP LSZH Patch Cord	20250-0200

Subject: Performance testing of category 6A shielded channel per IEEE 802.3bt™ for support of Type 4 remote powering applications commonly referred as PoE++

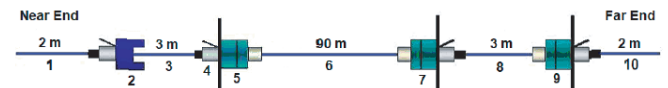
Dear Mr. Kumar:

This letter report represents the results of our evaluation of the above referenced product(s) to the requirements contained in the following document(s):

IEEE Std 802.3bt™ Standard for Ethernet, Amendment 2: Physical Layer and Management Parameters for Power Over Ethernet over 4 Pairs

SECTION 1 SUMMARY

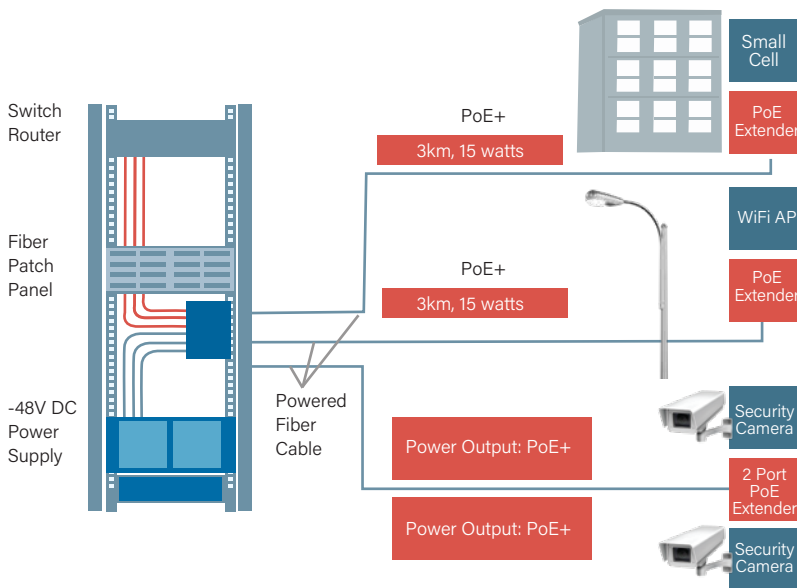
Intertek wishes to inform you that the electrical transmission tests have been performed on your channel configuration. This testing was performed under project G104681160 and quotation CE-QUO-BAN-20-002526 issued 03-March-2021. Compliant results were obtained for the relevant tests contained in section 145 of IEEE 802.3bt™ for channel transmission performance.



Component Id	Manufacturer	Description	Part number
1, 10	3C3	S/FTP LSZH Patch Cord	23350-0200
2	3C3	Faceplate / Shielded Outlet	14041 / 12319
3	3C3	S/FTP LSZH Single-Ended Patch Cord	85601-0300
4	3C3	Shielded Field Terminable Plug	12919
5, 7	3C3	Patch Panel / Shielded Outlet	11810 / 12319
6	3C3	S/FTP LSZH Horizontal Cable	10310
8	3C3	S/FTP LSZH Single-Ended Patch Cord	85600-0300
9	3C3	Patch Panel / Shielded Outlet	11820 / 12319

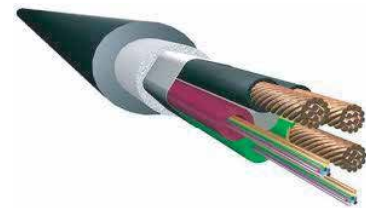
Fiber Solutions for PoE Application

Hybrid aerial, underground cable is very innovative and versatile cabling solution with in built power transmission required for network equipments with OFC cables. Hybrid Composite Cable is need of a day, firstly to support for power transmission for always ON (Interrupt free) telecom needs.



Hybrid Cable

Hybrid cable combines both fiber optic and copper conductors within a single cable. It can be used to transmit both data signals over the fiber optic portion and power or electrical signals over the copper conductors. These cables are often used in applications where both data and power need to be delivered to devices, such as security cameras (PoE) or remote sensors.



Media Converter

PARAMETER	VALUES
Standards	IEEE 802.3 10BaseT(x) Ethernet IEEE 802.3u 100BaseTX Fast Ethernet IEEE 802.3af/at Power over Ethernet
Port	1 Port 10/100/100 Base-TX RJ 45
Power Consumption	2.4Watts
Max. PoE Power Budget	30Watts
Housing	Metal, IP30 protection



Features

- Low Interference between Optical and Power Area
- Aerial Mounting & Pole Mounting
- Easy Expansion



Manufacturing Plant: 3C3 India Private Limited

No: 8-A, Bidadi Industrial Area 2nd Phase, Sector-1,
Ramanagar Taluk, Ramanagar District Karnataka,
India-562109.

Sales Office : Bengaluru

No.103, Brigade Rubix,
Watch Factory Road,
Phase-1, Yeshwanthpur,
Bengaluru, Karnatak - 560013

Sales Office : Delhi

Bhive11, Building No 94, 1st Floor,
Ishwar Nagar, Near Shambhu
Dayal Bagh, Bahapur, Okhla,
New Delhi - 110020

Sales Office : Mumbai

Awfus 12B, Reliable Tech Park,
B wing, Thane - Belapur Rd,
Gavate Wadi, MIDC, Airoli,
Mumbai Maharashtra 400708

Telephone: +91 80-2991 1144 / E-mail: sales@3c3.in / Website: www.3c3.in

Ahmedabad | Bangalore | Bhubaneswar | Chennai | Delhi | Hyderabad | Kochi | Kolkatta | Mumbai | Pune | Dubai | Kenya

